La Nature for April 24 contains an account of the experiments and measurements which have been made to discover what was the cause of the notoriously bad acoustical properties of the large hall of the Trocadéro at Paris. The work has led to several valuable conclusions as to the effect of a sound reaching the ear by two paths which differ in length by various amounts up to 34 metres. One of these is embodied in the statement that, for good audition, surfaces far from the audience must be absorbent, while surfaces near them must be reflecting.

IT will be remembered that two years ago the well-known "pleochroic haloes" observed in rock sections were shown to be due to the radio-activity of the inclusion round which the halo occurs. The point was brought out about the same time by Prof. O. Mügge in Germany and by Prof. Joly in this country. The former author now contributes further observations on the action of radium in producing these effects on a variety of minerals. His results will be found in the *Centralblatt für Mineralogie* (1909, p. 65).

MR. C. BAKER, of 244 High Holborn, W.C., has submitted to us two microscope objectives of a new formula which he has recently placed on the market. They are (1) a one-sixth inch numerical aperture, 0·75; (2) a one-twelfth inch numerical aperture, 1·30. The former has approximately a working distance of one millimetre, which for its focal length is considerable, and is intended for use with thicker cover glasses or with a hæmocytometer. The one-twelfth inch objective is particularly suited for bacteriological work, and, considering that it has a large field, its definition is excellent. We have tried these lenses both visually and photographically, and can find little fault with them. They are of the type that most English makers have recently introduced, and are intended to meet the need for cheap lenses for students' purposes and for ordinary use in the commercial applications of the microscope. The prices of these lenses are thirty shillings and five pounds respectively, and it is somewhat reassuring to find that English firms are making a determined effort to meet the severe Continental competition in the cheaper class of microscope apparatus, by introducing lenses of such a high order for so reasonable a price. Photographically, both these lenses are most satisfactory, and, if used in conjunction with a light yellow screen which cuts out the blue-violet portion of the spectrum, the results to be obtained with them are excellent. In common with most lenses of this type, their focal length is slightly shorter than marked, but this but little detracts from their performance.

THE new White Star liner *Laurentic* left on her first voyage to Canada on April 29. The performance of this vessel, built by Messrs. Harland and Wolff, of Belfast, will be looked for with interest, as she is the first Atlantic liner to be fitted with a combination of reciprocating and turbine machinery. Meanwhile, we note from an article in *Engineering* of April 30 that the vessel has a length of 565 feet 6 inches over all, beam 67 feet 3 inches, and depth, moulded, 45 feet 6 inches; the displacement at service draught is about 20,000 tons. The idea of the combination of machinery is to utilise in the turbine the remaining heat energy in the exhaust steam from reciprocating engines, which is generally at a pressure not less than 10 lb. per square inch absolute. The Parsons steam turbine enables such steam to be expanded economically to a very low absolute pressure. In the *Laurentic* the reciprocating engines are of the triple-expansion type, with four cylinders to ensure perfect balancing. There are twin reciprocating sets, the low-pressure Parsons turbine being placed in the centre of the ship and abaft the main engines, giving three propeller shafts. Arrangements are provided for throwing the turbine out of action for all manœuvring, the reciprocating engines then passing their exhaust steam direct to the condenser. The experience derived from this vessel should be of service in proportioning the machinery of the two 45,000-ton White Star liners now being built in Belfast.

OUR ASTRONOMICAL COLUMN.

MERCURY AS AN EVENING STAR.—In the comparatively clear evening skies of the past week, the planet Mercury has not been difficult to locate when one knew the direction in which to look for it. At present it is in the constellation Taurus, to the south-west of β Tauri, and sets about two hours after sunset.

The greatest eastern elongation takes place on May 20, but the planet is better seen some days before, rather than after, an elongation occurring in the spring. At 8.30 p.m. on Saturday last, May 8, it was easily found with opera-glasses whilst some four or five degrees from the horizon, and then watched for some time with the naked eye.

THE PRESENT SOLAR ACTIVITY.—A large group of spots was seen coming round the eastern limb of the sun on Friday last, May 7, and was in full view on Saturday, when it was seen to consist of two moderately large spots with several smaller ones, and to cover a fairly extensive area. On Sunday the group was visible to the naked eye, shielded by a piece of smoked glass, whilst with a pair of opera-glasses (×3), similarly shielded, it was quite a prominent object.

Spectroscopic observations made at the Solar Physics Observatory by Mr. W. E. Rolston on Saturday showed that the dark D_3 (helium) line was to be seen quite marked in the different inter-umbral areas and beyond the group.

THE INTRA-MERCURIAL PLANET PROBLEM.—As reported in our discussion of the results obtained by the Lick-Crocker eclipse expedition to Flint Island (NATURE, No. 2038, vol. lxxix., p. 70, November 19, 1908), Prof. Campbell considers that the negative results obtained at successive eclipses in the search for a possible intra-Mercurial planet demonstrate that no such planet exists as would account for the anomalies in the motion of Mercury.

In the May number of the *Popular Science Monthly* (vol. lxxiv., No. 5, p. 494) he now gives a most interesting popular account of the search for the hypothetical planet, and the means whereby its existence has been disproved.

In closing this account, Prof. Campbell refers favourably to Prof. Seeliger's recently published conclusions that the Mercury anomalies may be accounted for by the action of the material which gives rise to the zodiacal light, and shows that the figures calculated by Seeliger agree, within the probable errors, with the observed values, as reduced by Newcomb, of the perturbations of Mercury, Venus, the earth, and Mars.

The Lick Observatory search is fully discussed, in Bulletin No. 152, by Dr. Perrine, who points out that, whilst small bodies may yet be discovered near the sun, the eclipse plates show that no planet of the eighth magnitude was photographed. Such a planet would hardly exceed twenty or thirty miles in diameter, and it would require about a million such bodies to account for the outstanding Mercury perturbations.

PARTIAL ECLIPSE OF THE SUN IN CANADA.—From Dr. Downing we have received particulars of the partial phase of the solar eclipse of June 17 as visible at the Canadian observatories. At Ottawa the greatest phase (0·601) will occur at 7h. 43m. (standard time, 5h. W.), and the sun will set partially eclipsed at 7h. 50m.; first contact will occur at 6h. 52m. At Toronto the times will be:—first contact, 6h. 57m.; greatest phase (0·540), 7h. 48m.; sunset, 8h. 0m. In each case the sun's altitude at first contact will be approximately 9°

SPECTROSCOPIC BINARIES.—A number of newly discovered spectroscopic binaries are discussed briefly in No. 3, vol. xxix., of the *Astrophysical Journal*. Prof. Campbell reports that, in the course of the regular observing programme with the Mills spectrograph, the following eleven stars have been shown to have variable radial velocities:—γ Persei, ξ Tauri, θ^2 Tauri, l (53) Eridani, ζ Aurigæ, ρ Orionis, β Canis Majoris, ν Draconis, 70 Ophiuchi, 111 Herculis, and ϕ Cygni. Of these, γ Persei and l Eridani probably have long, whilst θ^2 Tauri and β Canis Majoris probably have short, periods, and 70 Ophiuchi is a well-known double star with a period of eighty-eight years.

As the result of the recent investigations of the D. O. Mills expedition to Santiago, Chile, Dr. Heber D. Curtis announces that five stars, ζ Canis Majoris, τ Puppis, o Velorum, d Carinæ, and q Velorum, have been shown to be spectroscopic binaries, the first four probably having long periods. Two other stars, ν Puppis and ν Octantis, also photographed at Santiago, are announced by Prof. W. H. Wright as spectroscopic binaries.

HARVARD COLLEGE OBSERVATORY.—Prof. Pickering's report of the work performed at the Harvard College Observatory during the year ending September 30, 1908, directs special attention to the large amount of publication during that period. With the help of a monetary grant from Mr. Fairchild, no fewer than six volumes of annals have been completed, the publications of the twelve months exceeding in amount those of the first thirty years of the observatory's existence. Fourteen thousand settings with the polarising photometer related chiefly to variables of the Algol type, and will serve to determine their light-curves and epochs of minima. About thirteen hundred settings on the asteroids Iris and Eros showed that at present their light does not vary. Four thousand one hundred stellar photographs were taken at Cambridge and 3509 at Arequipa during the year, and numerous nebulæ, stars with peculiar spectra, six meteor trails, and many variable stars were thus discovered.

THE PERCY SLADEN TRUST EXPEDITION TO THE INDIAN OCEAN.

FINAL EXPLORATIONS.[1]

THE field work of the above expedition has now been completed with the return of Messrs. H. Scott and J. C. F. Fryer from the Seychelles and Aldabra on March 29. Mr. Scott has brought with him more than 40,000 insects from the Seychelles as a result of eight months' collecting. Among these are many remarkable forms, including a very large number of beetles, which will take some years to determine. The tropical rains of December and January brought out a great variety of insects not previously obtained.

Mr. Fryer spent nearly five months in Aldabra. His preliminary report, which is subjoined, is of great interest as showing the foundations on which that so-called atoll is built. Aldabra contains about fifty square miles of land, and was supposed to be a typical atoll, almost completely land-locked. It was also known for its still containing numerous gigantic land-tortoises, and for its partially peculiar avifauna. Some sand from it, which I obtained in 1905 in Seychelles, showed the presence of a considerable quantity of silica, on account of which we deemed its exploration necessary.

Mr. R. H. Rastall, who has examined some fragments of the Aldabra rocks, forwarded to me by post, writes that "they promise to be of very great petrological interest, as they consist for the most part of spherulitic and devitrified volcanic glasses."

J. STANLEY GARDINER.

I arrived in Aldabra at the end of the south-east monsoon. Owing to the extreme dryness of the season I decided to explore the island at once with regard to its geological formation, leaving its zoology and botany until the wet season.

I had four camps, *i.e.* on Michel Island, at Takamaka on Main Island, on Esprit Island, and on Picard Island, from which I examined every portion of the so-called atoll. Owing to the dense and almost impenetrable scrub there were always great difficulties, as I had everywhere to cut paths; in addition, I cleared several broad sections from the sea to the lagoon in order to get a clear idea of the sequence of the rocks and vegetation and of the relative elevations.

The nature of the ground and of its vegetation is such that the land may be divided into four somewhat irregular zones, from the lagoon outwards, as follows:—

(1) Mangrove swamp—varying in size up to nearly a mile in maximum breadth.

(2) Champignon—the surface much metamorphosed, highly crystalline, coral rock, usually with sharply defined dark portions, in which the crystals appear to be imbedded in a brown amorphous substance. It has evidently been subjected to heavy rain denudation, its surface being a mass of points and pits. The vegetation is a scrub of *Pemphis acidula*.

(3) Platin—fairly smooth, composed mainly of coral fragments and reef débris with a few shells, weathering into large flat slabs with soil accumulating in the crevices. In places are larger depressions, in which there are usually clumps of trees. The soil is guano, with a mixture of disintegrated rock. The vegetation is varied, containing numerous small bushes and trees, Pandanus, Ficus, Euphorbia, &c.; the fauna is also varied, and comparatively rich.

(4) Shore zone—largely of blown sand, with a stunted and wind-swept vegetation; large clumps of Pandanus, Tournefortia, and Scævola everywhere very numerous.

In a broad sectional clearing which I made at Takamaka, the seaward reef commences with a fissured edge, succeeded by a sand flat, the sand being bound together by beds of grass-like Cymodocea, its rhizomes greatly overgrown by Lithothamnia; the buttresses between the fissures are themselves largely covered with sand; live coral is almost absent; not far from the edge are a few small boulders of dead coral, all much encrusted with Lithothamnia; a few species of seaweed are found in the pools left at low tide. The landward edge of the reef is formed of cliffs 12 feet to 15 feet high, just outside which is usually a small depression in the reef with 2 feet or 3 feet of water. The cliffs are sloping, not overhanging, and are divided into buttresses; they consist of a mass of corals cemented together with lime. The corals are all in the position in which they grew, and so perfect that they give the impression that they are only just dead. On the landward side of the cliffs is a ridge, 2 feet or 3 feet higher, of grass-covered sand; this marks the seaward edge of the shore zone, which is about 250 yards wide, the sand being shallow and lying on a basis of coral rock. Then comes a ridge, 4 feet to 6 feet higher, the rock more solid and less denuded; this, the highest part of the section, is some 25 feet above sea-level. From the landward side of this ridge the level gradually decreases to about 10 feet above sea-level. It passes into a zone of Champignon, which here lies outside the Platin zone, which latter extends to the mangrove swamp. The Platin is all very similar in appearance, except that it is more wooded near the lagoon; it terminates with a sharp drop through the last 4 feet or 5 feet to the lagoon surface. At Takamaka there is a spring of fresh water and a grove of large Calophyllum and Ficus trees. This spring, with three others all lying between Takamaka and the lagoon, is the only constant source of fresh water on the islands. The section finishes at Abbot's Creek, which is a narrow passage from the lagoon with a thick undergrowth of mangroves on each side; its bed is rocky, and covered with very fine white mud; at its termination in the land it passes between small cliffs, all much overhung and obviously breaking down.

In another section, which passes from Vert Island in the lagoon northward to the sea, the country is all, with the exception of the shore zone, of the Champignon type, Platin being entirely absent. There is a gradual slope from the lagoon, becoming steeper at the beginning of the shore zone; right up to the latter salt water is often

[1] For earlier reports see NATURE, April 13, August 10, October 5, November 9, December 21, 1905, January 25, 1906, and December 17, 1908.